

Application No.: 10/809,657
Docket No.: PE0667 US DIV3

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Remarks

Status of the Application

Claims 1-7, 9, 13-17 and 19-21 are now pending. Claims 1 and 21 are amended to specify that the first monomeric unit has a formula selected from the group consisting of Formulae I and I(a) to advance the prosecution on the merits, as well as to specify that when R groups pendant from Formula I form a single ring, R¹ may not be aryl or heteroaryl.

The pending claims stand rejected under 35 U.S.C. § 102(b) in separate rejections based on four references.

Claim Rejections – 35 U.S.C. § 102

The four separate rejections will be addressed independently below.

Inbasekaran

Inbasekaran, U.S. patent No. 5,777,070, discloses a conjugated alternating polymer containing a repeating dimer wherein a fluorene group may be identified as the A component of the dimer and an aryl group "Ar" may be designated as the B component of the dimer. In a previous amendment, Applicants amended claims 1 and 21 to specify that the copolymer cannot be an alternating copolymer of 9,9-di-n-octylfluorene and unsubstituted naphthalene as disclosed in Example 3 of this reference. Applicants respectfully submit that such amendment renders this rejection moot.

Kreuder

Kreuder, U.S. Patent No. 5,763,636, discloses a general formula (I) for a conjugated polymer including a spiro linkage (see claim 1, Col. 18, lines 35-40). Kreuder also identifies his polymers as containing spiro atoms (Abstract, formula (I)) and a plurality of spiro centers (Col. 2, lines 30-40). Spiro-containing compounds of the Kreuder disclosure are shown as structures in Examples 7, 8, 9 and 10. All of the other working examples (Examples 1 – 6) describe spiro-containing polymers or compositions. The copolymers of the present claims, as amended, can only form spiro compounds if the adjacent R groups that are pendant from the central ring of the fluorene structure of Formula I form a 5- or 6- membered cycloalkyl, aryl or heteroaryl ring. Please see claim 1. The claim has been amended to exclude any tricyclic pendant spiro moieties. Furthermore, even if Kreuder discloses anthracene or pyrene as the comonomer, the structure of the repeating unit is still fundamentally different than the claimed structures. Applicants

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respectfully submit that the amendments render this rejection moot, and that it should accordingly be withdrawn.

Kim '864

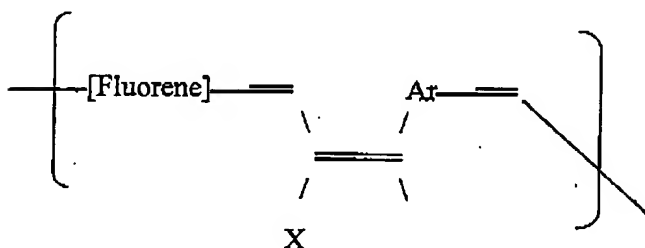
Applicants respectfully maintain their traverse of this rejection. To anticipate claims under review, the single prior art reference must disclose each and every limitation in the claims, in the order therein presented, and must enable the claimed invention. Kim '864 discloses a polymer described in the Abstract as a fluorene-based alternating polymer.

The present claims are directed to a copolymer having at least one fluorene-based comonomer having Formula I or Formula I(a) and at least one comonomer having a 6-membered heteroaromatic ring of Formula III (please see, e.g., claim 1), and as shown in the formulae, the linkages between both Formula I and Formula I(a) monomers and any other monomer is by single carbon-carbon bond. Similarly, the linkages between the Formula III monomer and any other monomer, represented by E in Formula III, is by single bond or a linking group selected from arylene or heteroarylene, both of which are bivalent radicals formed by removal of -H from two carbon sites on the aromatic nucleus, and thus also link to neighboring moieties via single carbon-carbon bonds. There is no acetylene bridge linkage, as in Kim '864, linking the fluorene moiety to another monomer or an end-capping group, as the case may be. In Kim '864, as shown in formula (I) the basic structural repeat unit (SRU) or backbone of the alternating polymer includes $\text{--}\equiv\text{Ar--}$ on the right of the fluorene group, where Ar represents substituted or unsubstituted phenyl, and $\text{--}\equiv$ to the left of the fluorene group, as illustrated in the formulae shown at Col. 4, line 50 to Col. 7, line 5, as well as the acetylene group on each end of the SRU (also the Abstract, Col. 4, lines 17-23, and claim 1). Kim '864 does not disclose the single bond linkages between fluorene and/or non-fluorene-based comonomers as required in the present claims. Because Kim '864 does not disclose this significant structural feature of the claimed copolymers and, in fact, discloses a different structure, Kim '864 does not anticipate the pending claims. Applicants respectfully request that this rejection has been rendered moot and should not be reasserted.

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Kim '974

Applicants respectfully maintain their traverse of this rejection, also. Kim '974 also discloses a fluorene-based alternating copolymer (Abstract). Formula (I) in Kim '974 depicts an SRU that contains a fluorene group and a side chain,



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Again, there is no there is no vinylene bridge between comonomers (here, fluorene and Ar) in the present claims. Like Kim '864, Kim '974 discloses a different structure than those of the present claims, having vinylene bridges between comonomers, a feature absent from the claims, and does not disclose single bond linkages between comonomers as required by the present claims. For these reasons, Kim '974 does not anticipate the pending claims. Applicants respectfully request that this rejection be withdrawn and not reasserted.

Conclusion

Applicants respectfully submit that a fully responsive paper is provided herein and that all pending objections and rejections have been overcome or rendered moot by the foregoing amendments and remarks. Accordingly, Applicants respectfully assert that the pending claims are in condition for allowance, and earnestly solicit a notice of allowance.

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NO. 5129 P. 18

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